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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/553,411

10/17/2005

Martin Bossert

1454.1629

3710

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EXAMINER

HO, HUY C

ART UNIT

PAPER NUMBER

2617

MAIL DATE

DELIVERY MODE

02/02/2011

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/553,411	<b>Applicant(s)</b> BOSSERT ET AL.	
	<b>Examiner</b> HUY C. HO	<b>Art Unit</b> 2617	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-12 and 20 is/are allowed.
- 6) ☒ Claim(s) 13-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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### DETAILED ACTION

1. In view of the Pre-Brief Conference request filed on 09/08/2010, PROSECUTION IS HEREBY REOPENED. New ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Patrick N. Edouard/

Supervisory Patent Examiner, Art Unit 2617.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. **Claims 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosur (US Publication 2001/0033623) and further in view of Giannakis et al. (US Pub 2008/0037685).**

**Regarding claim 13,** (Previously Presented) Hosur teaches a method of transmitting data by radio (*Hosur, the abstract*), comprising:

using a plurality of subcarriers of a frequency band and a plurality of antennas for transmission such that each antenna transmits data using the plurality of the subcarriers (*Hosur, paragraphs [13]-[14], OFDM using multiple antennas for transmitting symbols over subcarriers*);

dividing data for transmission into a plurality of data elements such that the number of data elements corresponds to the number of subcarriers (*Hosur, paragraphs* ;

for each antenna, assigning each element to a subcarrier for transmission, such that for at least two antennas and at least one subcarrier, different elements are assigned to said one subcarrier (*Hosur, paragraphs [33]-[40], two antennas assigned two symbols on a same subcarrier*);

performing an OFDM modulation for each antenna to produce timing sequences of time-dependent signals (*Hosur, paragraphs [22]-[24]*); and

for at least one antenna, rearranging the order of the time-dependent signals after OFDM modulation (*Hosur, paragraphs, [42]-[46], for multiple antennas, the data symbols on the corresponding subcarriers are transformed with estimated coefficient matrix of size of antennas time data symbols, or orders of data symbols are changed*).

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Hosur does not teach performing re-arranging the order of time dependent signals after OFDM modulation. Giannakis teaches OFDM technique for modulation data streams and transmission of data symbols on to subcarriers where the technique further applies a permutation matrix to symbols of data streams to cyclic shift of symbols by their index for maximum diversity, or other words, rearranging or cyclic shift the symbols using permutation matrix for the symbols (*Giannakis, the abstract, paragraphs [8]-[10], [25]-[26], claims 1 and 14*). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply permutation matrix to cyclic shift to OFDM symbols to rearrange symbols for maximum diversity performance for MIMO system using OFDM technique as discussed by Giannakis to Hosur's OFDM/MIMO wireless system to provide better performance and maximum ratio combining of data on the same subcarrier from multiple antennas as taught by Hosur (*Hosur paragraph [13]*).

**Regarding claim 14,** (Previously Presented) Hosur, as modified by Giannakis, teaches the method in accordance with claim 13, wherein for at least two antennas, the order is rearranged in accordance with a rearrangement common pattern (*Giannakis, paragraphs [8]-[10], [25]-[26], claims 1 and 14*).

**Regarding claim 15,** (Previously Presented) Hosur, as modified by Giannakis, teaches the method in accordance with claim 14, wherein the rearrangement common pattern is a cyclic permutation (*Giannakis, paragraphs [8]-[10], [25]-[26], claims 1 and 14*).

**Regarding claims 16, 18,** (Previously Presented) Hosur, as modified by Giannakis, teaches the method in accordance with claims 15, 13, wherein for at least two antennas an assignment common pattern is used to assign each element to a corresponding subcarrier (*Giannakis, paragraphs [8]-[10], [25]-[26], claims 1 and 14*).

**Regarding claim 17,** (Previously Presented) Hosur, as modified by Giannakis, teaches the method in accordance with claim 16, wherein the assignment common pattern is a cyclic permutation (*Giannakis, paragraphs [8]-[10], [25]-[26], claims 1 and 14*).

**Regarding claim 19,** (Previously Presented) Hosur, as modified by Giannakis, teaches the

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method in accordance with claim 18, wherein the common pattern is a cyclic permutation (*Giannakis, paragraphs [8]-[10], [25]-[26], claims 1 and 14*).

#### ***Allowable Subject Matter***

6. Claims 9-12 and 20 are allowed.
7. The following is a statement of reasons for the indication of allowable subject matter: prior art of record fails to disclose or teach or suggest claimed features "before performing an OFDM modulation for each antenna, multiply each element by an antenna-specific and an element-specific factor".

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUY C. HO whose telephone number is (571)270-1108. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Huy C Ho/  
Examiner, Art Unit 2617

/Patrick N. Edouard/  
Supervisory Patent Examiner, Art Unit 2617